

E. W. CRUIKSHANK & J. A. McANULTY.
 LOOM.

APPLICATION FILED MAR. 19, 1910.

Patented May 28, 1912.

4 SHEETS—SHEET 1.

1,027,996.

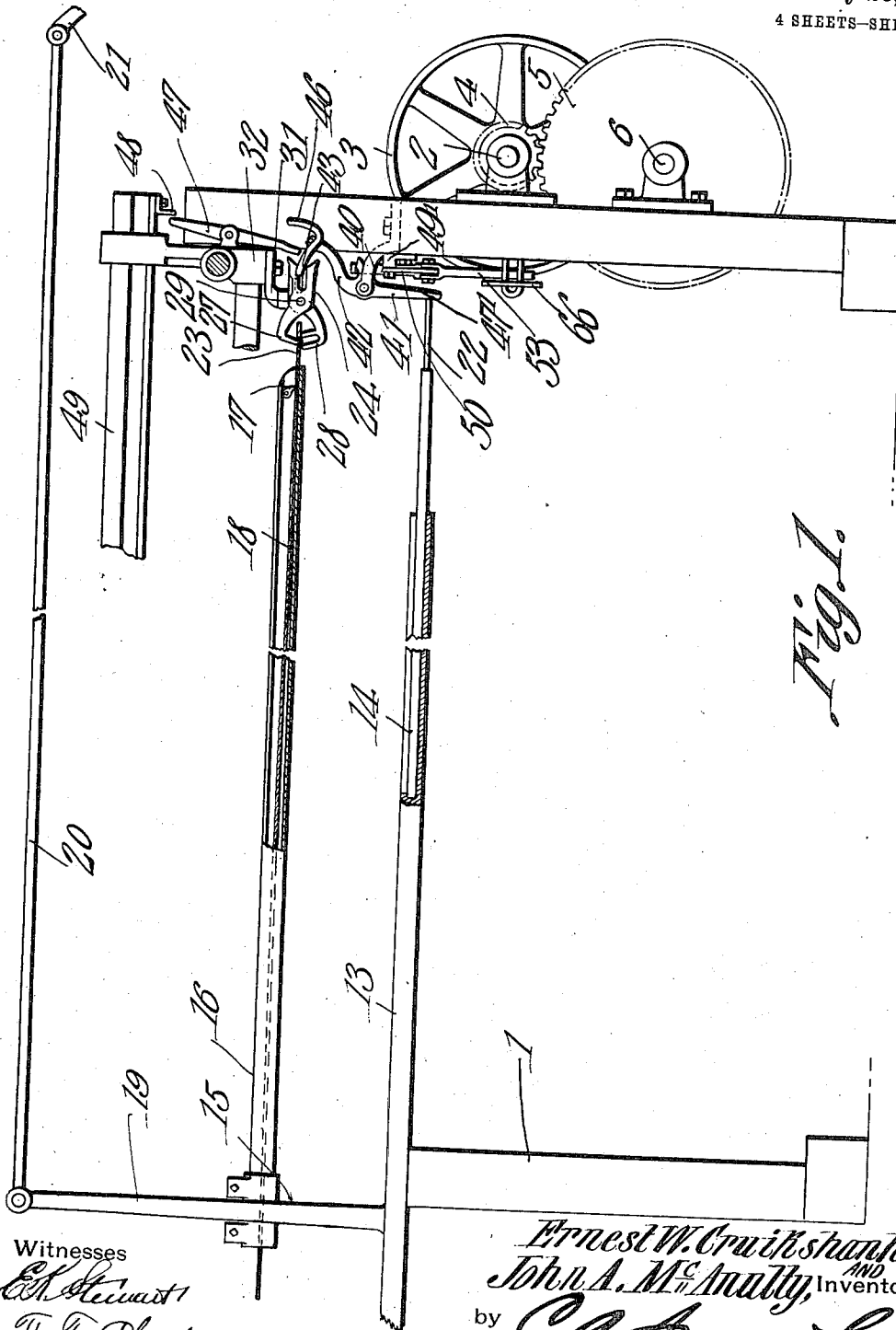


Fig. 1.

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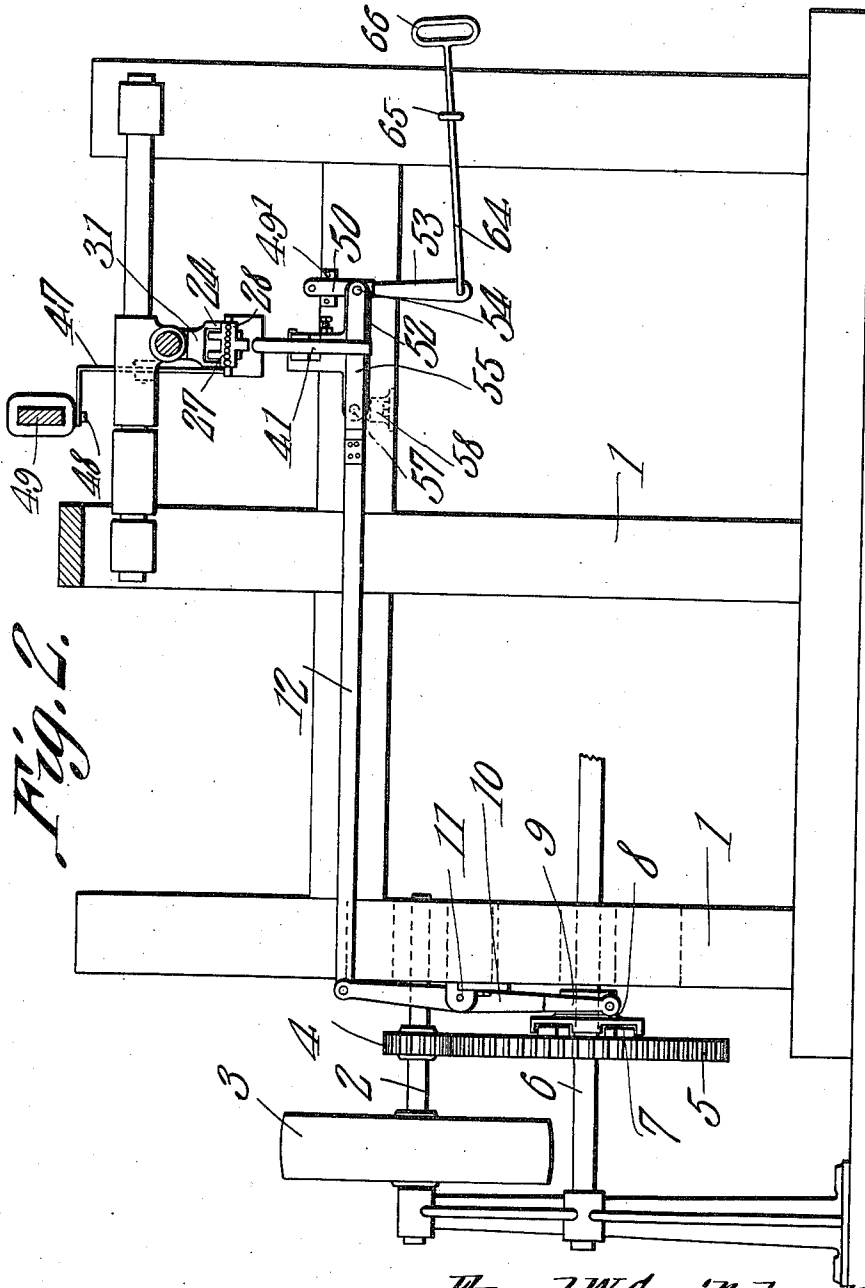


Fig. 2.

Witnesses

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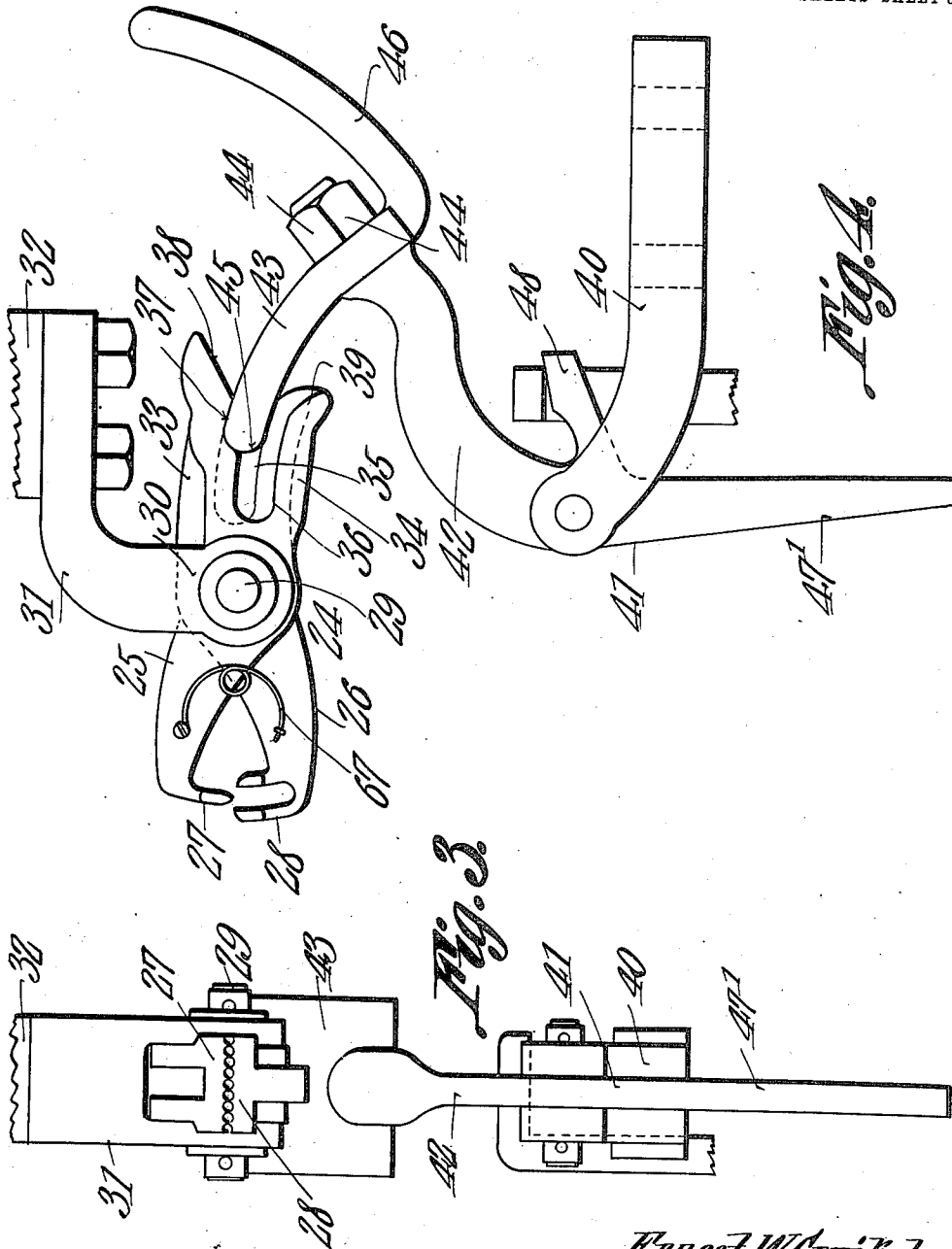
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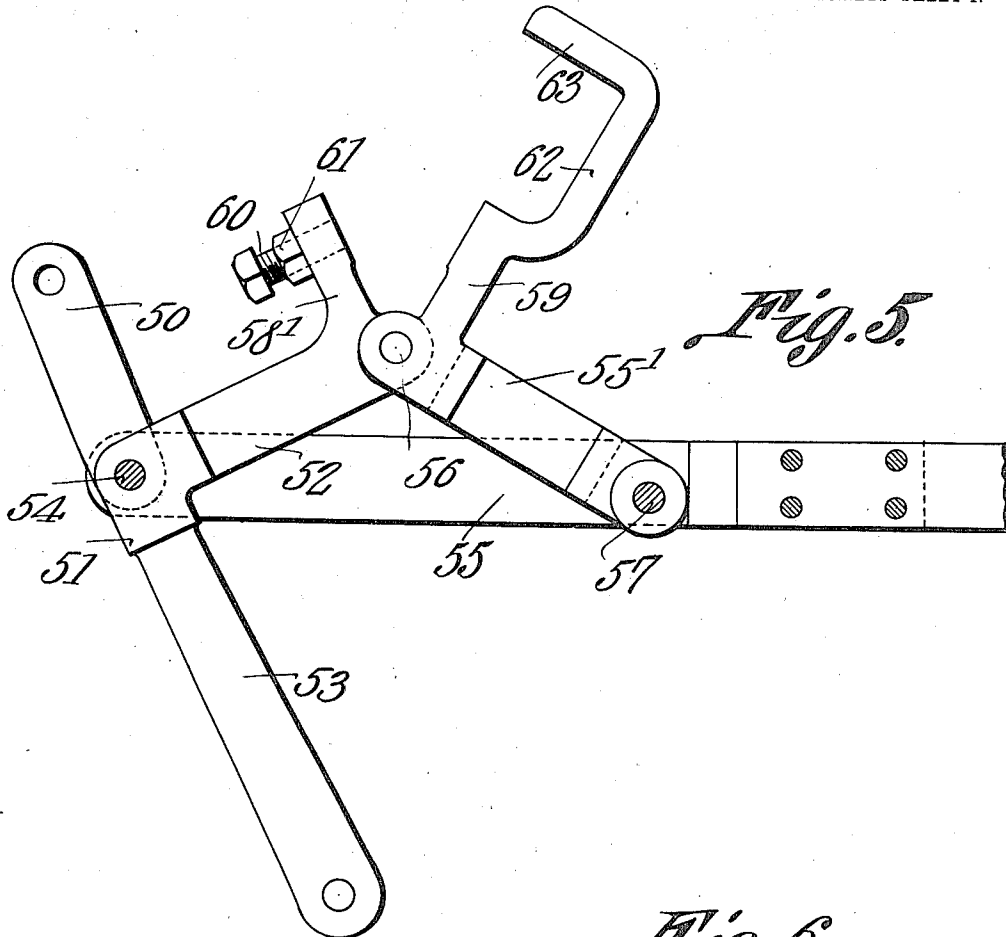
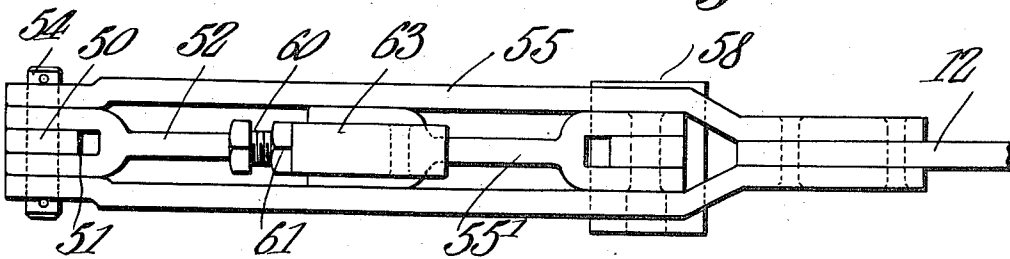


Fig. 6.



Witnesses

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LOOM.

1,027,996.

Specification of Letters Patent.

Patented May 28, 1912.

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To all whom it may concern:

Be it known that we, ERNEST W. CRUIKSHANK and JOHN A. McANULTY, citizens of the United States, residing in Baltimore city and State of Maryland, have invented a new and useful Loom, of which the following is a specification.

This invention has reference to improvements in looms more particularly of the type designed to weave coir mats and like fabrics where the wearing surface is in the form of a pile or tuft surface.

While the present invention is not limited to a particular type of loom, it is particularly adapted for use in connection with a loom where the tuft or pile is formed of a strand or a collection of strands acting as one strand, introduced into the warp shed transversely of the direction of travel of the warp strands through the loom, the tuft strand being carried parallel with and between weft strands in the proper timed relation to the movement of the shuttle.

In a loom of the type to which the present invention is particularly applicable the tuft strand is carried across the warp shed and the advance end of the strand is grasped by a suitable gripper after which the carrier for the strand retreats, and then by a suitable mechanism the tuft strand is formed into a series of loops, after which the end of the tuft strand remote from that grasped by the gripper is severed from the main portion of the strand, and the looped tuft strand is then beaten up by a proper action of the reed and the loops are cut in such manner that the raw-ends will constitute the wearing surface of the completed fabric. If, however, the gripper fails to catch and hold the presented end of the tuft strand the loom will no longer properly operate. It is the object, therefore, of the present invention to provide a means whereby the failure of the gripper to grasp and hold the presented end of the tuft strand will cause a disengagement of the power end of the loom from the several operative parts of the loom so that the action of the loom is stopped and will so remain until the fault is remedied.

In accordance with the present invention the gripper is so constructed and is associated with cooperating mechanism in such manner that on the failure of the tuft strand

to be introduced into the gripper and grasped thereby the coacting mechanism will become active to uncouple the power receiving end of the loom from the several mechanisms driven thereby.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings:

Figure 1 is an elevation, with parts in section, of the tuft strand gripping devices and associated cooperating mechanism, all parts unnecessary for an understanding of the present invention being omitted. Fig. 2 is an elevation of the structure of Fig. 1 at right angles thereto, the view being taken from the right hand end of the showing of Fig. 1. Fig. 3 is a front elevation of the gripper on a larger scale than shown in Figs. 1 and 2 and illustrating a portion of the cooperating mechanism. Fig. 4 is a side elevation of the structure shown in Fig. 3. Fig. 5 is an elevation of a portion of the structure cooperating with the gripper to constitute the stop motion, the particular showing of Fig. 5 being limited to a toggle structure forming part of the throw-off or stop motion. Fig. 6 is a top plan view of the structure of Fig. 5.

Referring to the drawings there is shown in Figs. 1 and 2 a frame 1 constituting the framework of the loom, the showing being largely indicative and all parts of the loom not necessary for an understanding of the present invention being omitted. The loom is provided with a counter shaft 2 carrying a drive pulley 3 which may be taken as indicative of any means of applying driving power to the loom and consequently this pulley may be replaced by an electric motor or the like.

In the particular arrangement of the loom illustrated the shaft 2 carries a pinion 4 meshing with a gear wheel 5 mounted on a shaft 6 constituting the power shaft of the loom. The gear wheel 5 is not made permanently fast to the shaft 6 but is so mounted on the shaft as to be capable of freely rotating thereon. The gear wheel 5 is provided with one member of a clutch 7 the other member 8 of which is movable toward or from the gear wheel in the direction of the longitudinal axis of the shaft

6 but is constrained to rotate with the shaft 6 at all times when the shaft is rotating.

The clutch 7 may be of known type and the movable member 8 is under the control of a fork 9 straddling the member 8 and formed on one end of a lever 10 pivotally mounted in a bracket 11 fast on the frame 1. In the particular showing of the drawings the lever 10 is of the first order and connected to the end remote from the fork 9 is a link 12, the purpose of which will hereinafter appear. At an appropriate point on the frame 1 there is mounted an elongated guide 13 carrying a bar 14 having secured thereto near one end a post or standard 15 at the upper end of which there is secured a tube 16 of sufficient length to traverse the warp shed of the loom. This tube is open at each end and at the end remote from the standard 15 the tube carries a pawl 17 designed to engage and hold a tuft strand 18. The arrangement of the pawl 17 is such that it will grasp the tuft strand close to the corresponding open end of the tube 16. The bar 14 is also provided with an arm 19 connected by a link 20 to an operating lever 21 by means of which reciprocatory motion in proper timed relation to the several mechanisms of the loom is imparted to the bar 14, but these structures form no part of the present invention and have been omitted from the drawings. The bar 14 extends parallel with the tube 16 so that when the pawl end of the tube 16 has traversed the warp shed the corresponding end of the bar 14 is closed to the corresponding side of the loom frame. The said end of the bar 14 may be provided with an extension 22 yieldingly mounted in the bar for a purpose which will presently appear.

In the operation of the loom the tuft strand 18 is severed at a point a short distance in advance of the end of the tube 16 carrying the pawl 17 so that there is a short projecting end 23 of the tuft strand beyond the end of the tube 16. In the path of the tuft strand and at the side of the loom remote from that where the tuft strand enters on coming from a suitable source of supply, there is a gripper 24 best shown in Figs. 3 and 4. The gripper is composed of two members 25 and 26 terminating at one end in respective jaws 27 and 28, the jaw 28 being yoke shape and the jaw 27 being so situated as to be capable of entering between the legs of the yoke shaped jaw 28 on a sufficiently close approach of the jaw ends of the members 25 and 26 of the gripper. In the particular structure shown the two members 25 and 26 are mounted on a common pivot pin or axis 29 traversing the members about midway of their length. The jaws 27 and 28 are, in the particular structure shown, elongated in the direction of the length of the axis of the pivot pin 29,

but it will be understood that these jaws may be long or short in the direction named in accordance with the number of individual members of the tuft strand which latter whether made up of a single strand or a plurality of strands acting together may be considered, for the purposes of the present invention, as a single strand and therefore the term strand as used in connection with the tuft side of the loom is to be understood as including a single strand or a plurality of separate strands. The pin 29 is mounted in the bifurcated end 30 of a bracket 31 appropriately secured on a beam 32 constituting part of the frame of the loom. On the side of the pivot pin 29 remote from the jaws 27, 28 the gripper members 25, 26 are provided with continuations 33, 34 respectively. The continuation 33 has a curved recess 35 extending from the free end of the part 33 toward the pivot pin 29 in a direction generally longitudinal of the gripper and the end 34 of the gripper member 25 has a longitudinal recess 36 slightly curved in the direction of its length and extending generally longitudinal of said gripper member. The recess 36 is formed on one side with an offset 37 while the open end of the recess has diverging walls 38, 39. The open end of the recess 35 may also expand in a similar manner. Fast on the frame 1 of the machine at a point below the gripper 24 is a bracket 40 to which is pivoted a lever 41 of the first order in the particular showing and one arm 42 of this lever may be appropriately bent for the purposes of the invention. The free end of the bent arm 42 of the lever 41 carries a plate or blade 43 secured thereto by a nut 44 or otherwise and this plate or blade 43 is curved, with the pivot of the lever 41 as an axis. The free end of the blade 43 has a rounded edge 45 adapted to enter the recesses 35 and 36 while the width of these recesses and the thickness of the plate 43 are made to conform so that the plate or blade 43 may readily enter the recesses without binding but at the same time without undue lost motion.

Formed on the plate or blade 43 at the end remote from the rounded edge 45 is an arm 46, or this arm may be separately formed from the plate or blade 43, as found desirable. The arm 46 extends in the general direction of the length of the lever arm 42 and is in the path of one end of a lever 47 pivotally mounted on the frame 1 or an extension thereof while the other end of the lever 47 is in the path of a finger 48 or other such structure carried by a sliding bar 49 constituting part of the loom structure. The lever 41 has an arm 47' remote from the arm 42, and the free end of this arm 47' is in the path of the extension 22 of the bar 14. The lever 41 is also provided with a short arm 43' offset therefrom at a

point adjacent to the pivot support of the lever and at approximately right angles to the arm 47.

Secured to the frame 1 of the machine adjacent to the bracket 40 is another bracket 49' to which is pivoted one end of a link 50. This link carries at the other end an angle lever 51 composed of two members 52, 53 extending from the point of connection of the lever 51 with the link 50 at substantially right angles one to the other. The pivot pin 54 connecting the link 50 to the lever 51 extends through the free end of two spaced strips or members 55 in parallel relation one to the other and at the other end secured to and forming a continuation of the link 12. The arm 52 of the lever 51 is pivotally connected at the free end to a link 55' by a pivot pin 56 and the other end of the link 55' is connected by a pivot pin 57 to a bracket 58 secured to a fixed portion of the frame 1. The two members 52 and 55' constitute a toggle lever, the purpose of which will presently appear. Adjacent to the pivot connection 56 the arm 52 is provided with a stud or projection 58' and the link 55' adjacent to the pin 56 is provided with a stud or projection 59 matching the stud or projection 58' which latter is provided with an adjustable stop screw 60 carrying a lock nut 61 so that the relative position of engagement of the two studs 58' and 59 may be regulated by the position of the screw 60, these two studs determining the degree of alinement of the arm 52 and the link 55', thus permitting adjustment of the parts in the event of wear and avoiding the necessity of careful fitting. The center projection 59 has a continuation in the form of a finger 62 terminating in an overhang 63 designed when the parts are in their normal condition to overlie the member 48 of the lever 41. At the free end of the arm 53 of the lever 51 there is connected a link 64 suitably supported by a guide 65 on an appropriate portion of the frame 1 and terminating in a handhold 66 accessible to an operator.

When in the operation of the loom a tuft strand 18 is about to be carried across the warp shed, the tube 16 and the bar 14 are at the extreme left of the structure illustrated in Fig. 1 and the bar 49 has traveled toward the left sufficiently to bring the bracket 48 in engagement with the lever 47 so that the other end of this lever has been brought into contact with the finger 46 thus rocking the lever 41 on its pivot and removing the blade 43 from between the members 33 and 34 of the gripper, the jaws of the gripper being caused to open by any suitable means as for instance by a spring 67, shown in Fig. 4, this spring being indicative of any suitable means for the purpose. Under the circumstances assumed the

toggle members 52 and 55' are in alinement and the link 12 is thereby held at one limit of its movement, this being toward the right as viewed in Fig. 2. Therefore the link 12 through the lever 10 holds the members of the clutch 7 in engagement and power is transmitted to the shaft 6 and thereby to the operating parts of the loom. Now the tube 16 and bar 14 move across the loom and the projecting end 23 of the tuft strand 18 ultimately reaches a position between the jaws 27 and 28 of the gripper 24. As soon as this occurs the extension 22 of the bar 14 comes in contact with the arm 47 of the lever 41 and this lever is moved about its pivot in a direction to cause the blade 43 to enter the recesses 35, 36, the rounded end of the blade 43 first engaging the divergent edges leading into these recesses. The result of the movement of the lever 41 is to cause the blade 43 to move the ends 33 and 34 in opposite directions bringing the jaws 27 and 28 one toward the other. These jaws ultimately tightly grip the end 23 of the tuft strand and further approaching movement of these jaws is arrested thereby, the rounded end 45 of the blade 43 striking the end of the side extension 37 of the recess 36 so that the movement of the lever 41 on its pivot under the impulse of the extension 22 of the rod 14 is thereby arrested.

The parts are so proportioned that in the normal operation of the blade 43 in causing the active movement of the gripper the extension 48 of the lever 41 is stopped close under the overhang 63, but the extent of movement of the member 48 is insufficient to cause it to actively engage said overhang. Ultimately the bar 49 moves to a sufficient extent to operate the lever 47 and thus cause the rocking of the lever 41 to an extent to move the blade 43 from engaging relation to the ends 33 and 34 of the gripper when the spring 67 will cause the opening of the jaws 27, 28 and the release of the tuft strand where gripped by said jaws.

The operation of the machine in the particulars mentioned will continue uninterruptedly so long as the conditions stated are maintained. If, however, it be assumed that the tuft strand fails to reach the gripper so as to enter between the jaws 27 and 28, then on the engagement of the extension 22 of the bar 14 with the lever 47, no material resistance is offered to the entering of the blade 43 to the closed ends of the recesses 35 and 36, the inner end of the offset 37 of the recess 36 causing a movement of the gripper members to an extent permitting the introduction of the blade 43 to the ends of the recesses 35 and 36. The lever 41 will, therefore, rock on its pivot to a greater extent than before and the movement of the member 48 of the lever 41 is so extensive as to cause it to engage the over-

hang 63 in a manner to rock the link 55' on the pivot 57' and thereby flex the toggle made up of the link 55' and lever arm 52, this resulting in a longitudinal movement of the link 12, which will when transmitted to the lever 10 cause the separation of the clutch member 8 from the clutch member carried by the gear 5. If, therefore, the tuft strand is not properly gripped the power is disconnected from the operating parts of the loom and such parts are stopped thereby preventing the production of an imperfect weave. After the working conditions have been reestablished then the operator may by grasping the handhold 66 return the toggle mechanism to the aligned position and this will in turn move the lever 41 to retract the blade 43 from the recesses 35 and 36.

What is claimed is:

1. In a loom, a tuft strand actuating mechanism, a gripper for the tuft strand located in the path of the strand at the termination of its travel across the loom, and a throw-off or stop motion for the power side of the loom responsive to movement of the gripper in the active direction in the absence of a tuft strand in operative relation to said gripper.

2. In a loom, a tuft strand actuating mechanism, a gripper for the tuft strand located in the path of the strand at the termination of its travel across the loom, said gripper having a movement in the active direction in excess of the movement necessary to grasp the tuft strand, said excess movement occurring in the absence of a tuft strand in operative relation to said gripper, and a throw-off or stop motion for the power side of the loom responsive to excess active movement of the gripper.

3. In a loom, a tuft strand actuating mechanism, a gripper for the tuft strand located in the path of the strand at the termination of its travel across the loom, said gripper having a movement in the active direction in excess of the movement necessary to grasp the tuft strand, said excess movement occurring in the absence of a tuft strand in operative relation to said gripper, a throw-off or stop motion for the power side of the loom responsive to said excess active movement of the gripper, and an operating means for the gripper responsive to the active movement of the tuft strand actuating mechanism.

4. In a loom, a tuft strand actuating mechanism, a gripper for the tuft strand having a movement in the active direction in excess of the movement necessary to grasp the tuft strand, said movement occurring in the absence of a tuft strand in operative relation to said gripper, a throw-off or stop motion for the power side of the loom responsive to excess active movement

of the gripper, and a yieldable operating means for the gripper responsive to the active movement of the tuft strand actuating mechanism.

5. In a loom, a tuft strand actuating mechanism, a gripper for the tuft strand located in the path of the strand at the termination of its travel across the loom, said gripper having a movement in the active direction in excess of the movement necessary to grasp the tuft strand, said excess movement occurring in the absence of a tuft strand in operative relation to said gripper, and a throw-off or stop motion for the power side of the loom responsive to excess active movement of the gripper, and an operating means for the gripper responsive to different extents of the active movement of the tuft strand actuating mechanism.

6. In a loom, a tuft strand actuating mechanism, a gripper for the tuft strand located in the path of the strand at the termination of its travel across the loom, said gripper having a movement in the active direction in excess of the movement necessary to grasp the tuft strand, a throw-off or stop motion for the power side of the loom responsive to excess active movement of the gripper, and an operating means for the gripper responsive to different extents to the active movement of the tuft strand actuating mechanism.

7. In a loom, a gripper for a tuft strand having coacting gripping jaws movable one toward the other beyond the gripping position, an actuating means for the jaws coacting therewith to move the jaws actively to and beyond the gripping position, and a throw-off for the loom responsive to the movement of the gripper actuating mechanism beyond the gripping position.

8. In a loom, a gripper comprising two members having coacting gripping jaws at one end and at the other end formed with longitudinally disposed recesses, the recess in one member having a laterally offset portion, and a gripper operating means adapted to enter said recesses.

9. In a loom, a gripper comprising two members having coacting gripping jaws at one end, the jaw of one member being receptive to the jaw of the other member, said gripping members being formed at the other ends with longitudinally disposed recesses and the recess of one member having a laterally offset portion, and a gripper operating means adapted to enter said recesses.

10. In a loom, a gripper comprising two members having coacting gripping jaws at one end, the jaw of one member being receptive to the jaw of the other member, said members at the other ends being formed with longitudinally disposed recesses and the recess of one member having a laterally off-

set portion, means for operating the gripper consisting of a blade adapted to enter the recesses in the gripper members, and means for moving the blade to different extents into said recesses.

11. In a loom, a gripper comprising two members having coacting gripping jaws at one end, with one jaw receptive to the other jaw, and at the other end formed with longitudinally disposed recesses, one recess having a laterally offset portion, a blade movable to different extents into said recesses, a lever carrying the blade, and a tuft strand actuating mechanism movable to present a tuft strand to the gripper and at the same time engage the lever to move the gripper jaws in the active direction.

12. In a loom, a gripper comprising two members having coacting gripping jaws at one end with one jaw receptive to the other jaw, and at the other end formed with longitudinally disposed recesses, one recess having a laterally offset portion, a blade movable to different extents into said recesses, a lever carrying the blade, a tuft strand actuating mechanism movable to present a tuft strand to the gripper and at the same time engage the lever to move the gripper jaws in the active direction, and a throw-off for

the loom responsive to excessive movement of the lever.

13. In a loom, a gripper comprising two members having coacting gripping jaws at one end with one jaw receptive to the other jaw, and at the other end formed with longitudinally disposed recesses one recess having a laterally offset portion, a blade movable to different extents into said recesses, a lever carrying the blade and provided with an arm or extension, a tuft strand actuating mechanism movable to present a tuft strand to the gripper and at the same time engage the lever to move the gripper jaws in the active direction, toggles having means in the path of the lever extension on excessive movement of the lever, and coupling means for the power side of the loom movable to the inactive position by the flexing of the toggles.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

ERNEST W. CRUIKSHANK.
JOHN A. McANULTY.

Witnesses:

JOHN HENRY SKEEN
E. P. MUMFORD.